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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/727,133	11/29/2000	Ramin Emami	AMAT/3976.P1/CMP/CMP/RKK	2919
32588	7590	04/06/2005	EXAMINER	
APPLIED MATERIALS, INC. 2881 SCOTT BLVD. M/S 2061 SANTA CLARA, CA 95050			GOUDREAU, GEORGE A	
			ART UNIT	PAPER NUMBER

1763

DATE MAILED: 04/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/727,133

Applicant(s)

EMAMI ET AL.

Examiner

George A. Goudreau

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 November 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 6-14, 16-18, 21-38, 40-48, 50-57 and 60-62 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 61 and 62 is/are allowed.
- 6) ☒ Claim(s) 1, 6-14, 17, 18, 21-27, 29-33, 40-48, 50, 52, 55-57 and 60 is/are rejected.
- 7) ☒ Claim(s) 2-4, 16, 28, 34-38, 51, 53 and 54 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

George A. Goudreau
GEORGE GOUDREAU
PRIMARY EXAMINER

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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1. This action will not be made final due to the new grounds of rejection.
2. Applicant's arguments with respect to claims of record have been considered but are moot in view of the new ground(s) of rejection.
3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
5. Claims 1, 6-14, 17-18, 21-27, 29-33, 40-48, 50, 52, 55-57, and 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sun et. al. (6,709,316).

Sun et. al. disclose a two step cmp polishing process for removing a Ta barrier layer (112) from the surface of a wafer during the formation of a Cu damascene structure on the wafer, which is comprised of the following steps:

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The Ta barrier layer is first cmp polished using a cmp slurry, which is comprised of the following components:

- a reducing agent (i.e.-hydroxylamine, glucose, sulfathionate, potassium iodide, etc.);
- a chelating agent (i.e.-acetic acid, ethylenediamine, hydroxylamine, etc.);
- a pH-adjusting agent used to adjust the pH of the cmp slurry to (7-10);
- a corrosion inhibitor (i.e.-BTA, etc.);
- DI H₂O; and
- optionally contains abrasive particles

During the first Ta cmp polishing step, residual Cu left over from the previous bulk Cu cmp polishing step is also removed from the surface of the wafer.

The Ta barrier layer is then second cmp polished using a cmp slurry which is comprised of the following components:

- a pH-buffering agent;
- a reducing agent (i.e.-hydroxylamine, glucose, sulfathionate, potassium iodide, etc.);
- a chelating agent (i.e.-acetic acid, ethylenediamine, hydroxylamine, etc.);
- a pH-adjusting agent used to adjust the pH of the cmp slurry to (8-12);
- a corrosion inhibitor (i.e.-BTA, etc.);
- DI H₂O; and
- optionally contains abrasive particles

This is discussed specifically in columns 7-11; and discussed in general in

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columns 1-20. This is shown in figures 1-5. Sun et. al. fail, however, to specifically disclose the following aspects of applicant's claimed invention:

- the specific cmp polishing process parameters which are claimed by the applicant

It would have been prima facie obvious to employ any of a variety of different cmp polishing process parameters in any of the cmp polishing steps in the cmp polishing process which is taught above including those which are specifically claimed by the applicant. These are all well-known variables in the cmp polishing art, which are known to effect both the rate and the quality of the cmp polishing process. Further, the selection of particular values for these variables would not necessitate any undue experimentation, which would have been indicative of unexpected results.

Alternatively, it would have been obvious to one skilled in the art to employ the specific cmp polishing parameters which are claimed by the applicant in any of the cmp polishing process steps which are claimed by the applicant based upon *In re Aller* as cited below.

Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. ≡ In re Aller, 220 F. 2d 454, 105 USPQ 233, 235 (CCPA).

Further, all of the specific process parameters which are claimed by the applicant for their cmp polishing process steps are well known variables whose effects on the rate, and the quality of the cmp polishing step are well known in the cmp semiconductor processing arts.

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6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims 1, 6-14, 17-18, 21-27, 29-33, 40-48, 50, 52, 55-57, and 60 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-55 of U.S. Patent No. 6,709,316. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following.

8. Claims 2-4, 16, 28, 34-38, 51, and 53-54 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. Claims 61-62 are allowed.

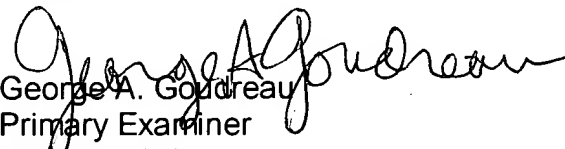
10. Claim 50 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

-Claim 50 depend upon cancelled claim 49.

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11. Any inquiry concerning this communication should be directed to examiner

George A. Goudreau at telephone number (571)-272-1434.


George A. Goudreau
Primary Examiner
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